

Incorporating household dietary and nutritional needs in quantitative farming systems analysis

Jorita van Valkenhoef, Inge Brouwer and Jeroen C.J. Groot

Introduction

Since the approximately 500 million smallholder farmers in the world produce 80% of the food supply in developing countries, increasing their productivity is likely to be a crucial component of the pursuit to eradicate extreme hunger and poverty (FAO, 2011). In the process of intensifying smallholder farming systems, the impact on household nutrition should not be overlooked. Not only do smallholder farmers (partly) depend on their production for the food of their household (Graham et al., 2007), the health and capacities of the people in the farm household are influenced by their nutrition. This in turn can have an impact on farm productivity (Demment, Young, & Sensenig, 2003; Victora et al., 2008). The adequacy of the diets of household members depends on a complex combination of components and interactions. This warrants the use of a systems approach, exploring which concepts are involved and how they relate. This research focuses on the development of a conceptual framework and the investigation of different options for integrating a household nutrition component in quantitative farming systems analysis.

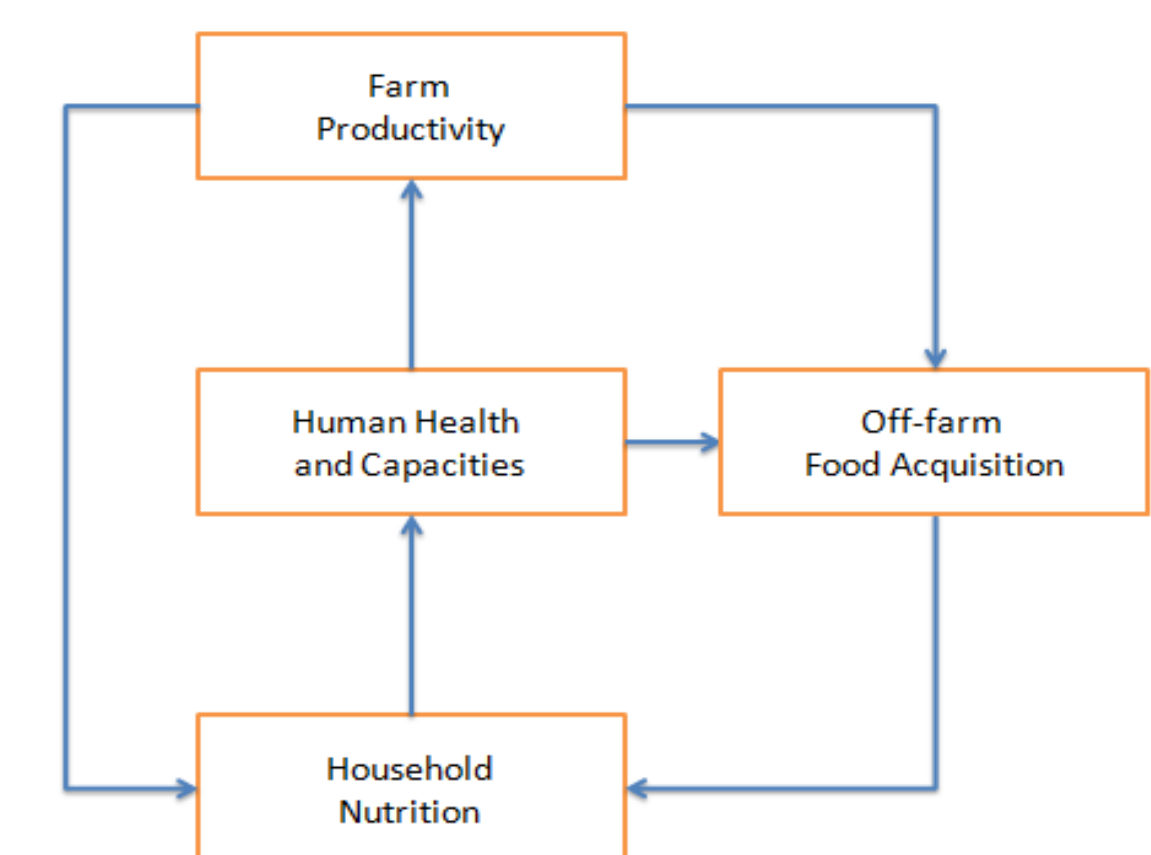


Figure 1. Visual representation of the relations between household nutrition, human health and capacities, farm productivity and off-farm food acquisition

Methodology

A conceptual framework was constructed based on a literature review, followed by the identification of options for integrating a household nutrition component in farming systems analysis. Methods were developed for implementation of these different options in the whole farm models used to diagnose and re-design farming systems.

Incorporation Options

Table 1. Overview of the different qualities of the three incorporation options

	Dietary Diversity Proxy	Nutrient Balance approach	Food Pattern approach
Focus	Dietary diversity is used as a proxy for nutrient adequacy of an individual's diet. At the household level, an increased household dietary diversity score is associated with household food security and socio-economic status.	Balance between the nutrient requirements of the household (members) and the amount of nutrients available for consumption.	Balance between the food required by the household and the food available for consumption by the household.
Specific information requirements	A list of food groups used for scoring and the number of food groups from which one or more products are consumed.	Information on household member nutrient requirements, household composition and produce nutrient content.	Dietary guidelines for the different household members and information on household composition
Use	Comparison between individuals, households or farming system configurations. In design by including it as an objective or constraint (e.g. to retain, increase or maximize) in the process of multi-objective optimization.	Analysis of nutritional adequacy of the food available for consumption in a scenario. In design by including nutritional adequacy as an objective or constraint in the process of multi-objective optimization.	Analysis of adequacy of the amounts of foods available for consumption in a scenario. In design by including adequacy of the supply of the relevant food items as an objective or constraint in the process of multi-objective optimization.
Nutritional needs taken into account	By means of a proxy	Yes	Yes
Dietary needs taken into account	Only diversity of diet	No	Yes

Conceptual framework

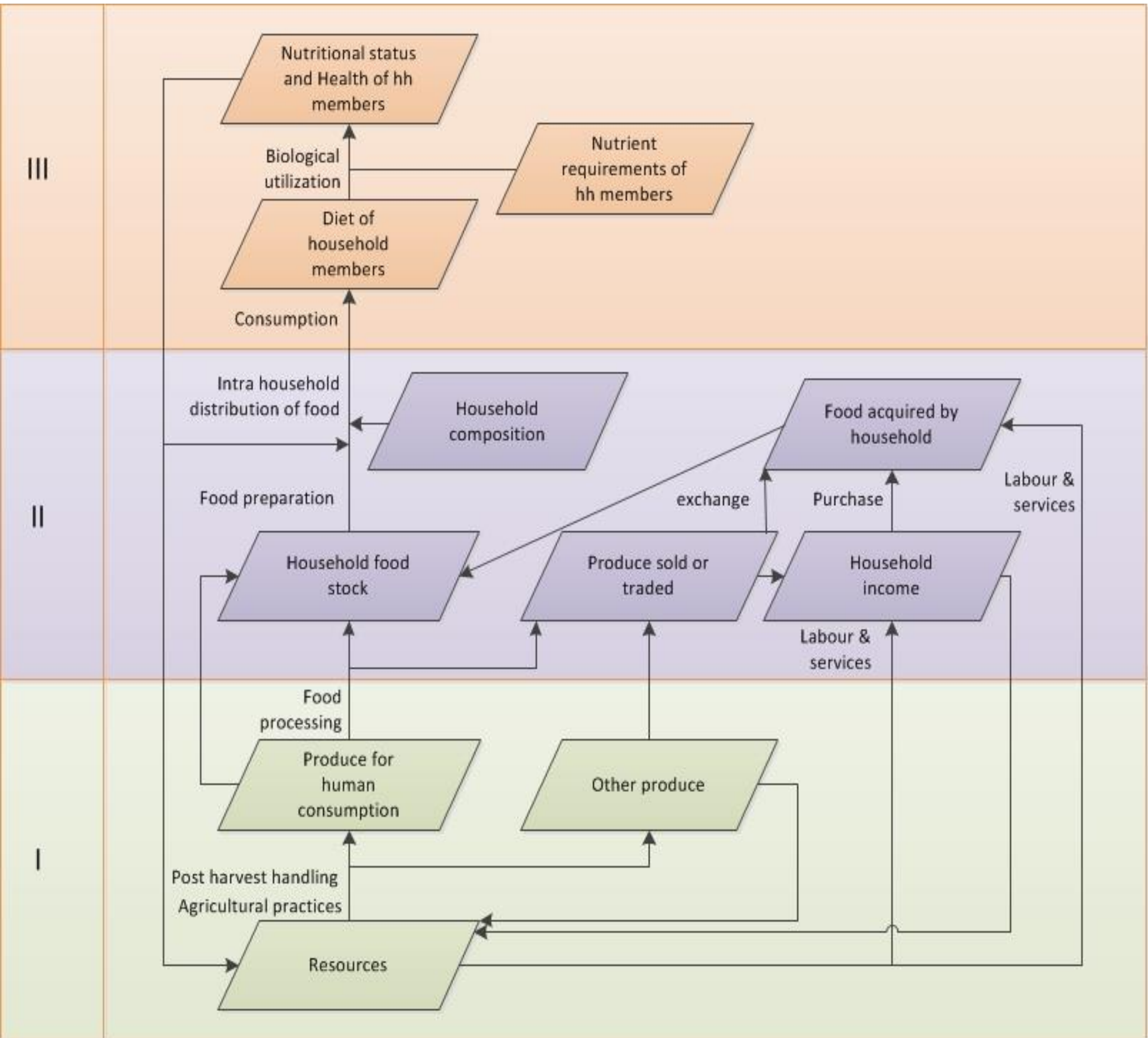


Figure 2. Visual representation of the conceptual framework for incorporating household dietary and nutritional needs in quantitative farming systems analysis. Component I (green) encompasses production, component II (purple) household and component III (orange) the individual household members. Boxes indicate states; arrows between states indicate a possible impact pathway. Not indicated in the figure are losses occurring during production, post-harvest handling and processing, and food waste at the household and individual level.

Conclusions

- A conceptual framework was developed describing concepts and relations relevant to the incorporation of household dietary and nutritional needs in quantitative farming systems analysis.
- Three distinct options for incorporation were identified.

Acknowledgements

We wish to thank the participating experts and farmers. The case study was financed by the Africa RISING program funded by the Feed the Future Initiative of the United States Agency for International Development (USAID).